WATER MANAGEMENT
PROSPECTIVE TRIP TO AUSTRALIA

13 – 29 octobre 2000

by

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Janvier 2001

Glossary of Terms

ACIAR	Australian Centre for International Agricultural Research
ANU	Australian National University
CIRAD	Centre International de Recherche en Agriculture pour le Developpement
CRES	Centre For Resource and Environmental Studies
CSIRO	Commonwealth Scientific and Industrial Research Organization
DISR	Dept of Industry, Science and Resources
ICAM	Integrated Catchment Assessment and Modelling Centre
ISIA	Institute of Sustainable Irrigated Agriculture
LWRRDC	Land & Water Resources Research And Development Corporation
PIRSA	Primary Industries and Resources South Australia
RSPAS	Research School of Pacific And Asian Studies
PCSI	Programme Commun Systèmes Irrigués

1. Background

CIRAD is a French organisation specialised in agricultural research for the Tropics and Subtropics. CIRAD has mandate to contribute to rural development through: research, experimentation, training operations in France and abroad, scientific and technical information. The main fields of research include agronomy, veterinary, forestry, economics and post-harvest technologies.

Water management is a major issue for most of the countries where CIRAD is involved, whether it is in terms of scarcity, flooding or pollution. Several projects are focusing on these issues, among others:

- Promoting local and participating water management, in Brazil and South Africa.
- Managing irrigation on sodic degraded soils, in Senegal and Mali.
- Green mulching to restore infiltration of acid soils, in Vietnam and Madagascar.
- Adapting farming practices to short term climate variation, in Indonesia.
- Using poor quality waters for peri-urban horticulture, in Thailand and Vietnam.

Research on water management requires an holistic, integrated and adaptive approach. In order to cope with this task, CEMAGREF, CIRAD and IRD have pooled their international research expertise on water and irrigated farming systems in a collaborative program called PCSI. Beside the implementation of projects in developing tropical countries, PCSI aims at creating or strengthening links with other Advanced Research Centres. According to Australia's geographical location and its mediterranean to tropical environments, local partnerships are highly profitable for PCSI.

Meanwhile, the French Embassy in Canberra has given a high priority to scientific collaborations on Agriculture and Environment with Australian partners. According to the local dramatic issues on salinity and water resources, Water Management stands as a figurehead within this global strategy. As a matter of fact, this prospective trip has been sponsored by the Sciences and Technology division of the French Embassy.

The French Embassy has acknowledged CIRAD's effort to consolidate its links with Australian partners and to develop collaborative projects abroad. Thus, it has been agreed that CIRAD would coordinate the scientific exchanges supported by the French Embassy and would appoint a part-time adviser for Agriculture and Environment issues. Thus, during year 2001, several initiatives will be launched according to existing relationships or contacts. The present report is proposing several opportunities of collaboration concerning Water Management, based on the fruitful discussions Dr R.Ducrot, S.Marlet and P.Perez have had with their Australian colleagues.

2. Field Trip

A prospective trip concerning Water Management in Australia is not an easy event to organise, regarding the following:

- The number of institutions concerned and their different levels of involvement.
- The long distances between the different resource and knowledge centres.
- The duplication of institutions due to the federal structure.
- The complexity of the environmental problem itself.

Considering these limitations, it has been decided to organise the trip according to the already existing contacts developed locally by P.Perez and to focus on the different actors concerned by the Murray Darling Basin. Four topics had to be addressed:

- Presentation of CIRAD's and PCSI's offer concerning Water Management.
- Opportunities of exchanges with Australian partners (student, postdoc, senior).
- Common interests in developing collaborative projects (Australia or abroad).
- Exploring the different source of funding for such a project.

The time schedule (Appendix 1) and the list of contacts (Appendix 2) are presented at the end of this report. The panel was established in order to give the CIRAD's experts a view of: (i) the federal organisation of the research and R&D institutions (SA, VIC, NSW, ACT), (ii) the different sorts of scientific bodies involved (CSIRO-LW, ISIA, UA, ANU), (iii) the commitments of different Departments or agencies (PIRSA, LWRRDC, DISR), (iv) the bilateral or international sponsors' strategies (EU, ACIAR, MAE).

It has to be noticed that, despite several attempts, it has not been possible to meet with representatives from the MDB Commission. This exception cannot tarnish the remarkable liability and kindness of all the people encountered during these 15 days.

3. Scientific Outputs

Visit to South Australia

CIRAD's experts were introduced to colleagues from CSIRO-LW, UA and PIRSA grouped on the Waite Campus (Glenn Osmond). The Soil & Water Environs Centre is an attractive environment for collaboration because of its tripod structure (Academic / Research / Policy). This would surely facilitate student exchanges (Split Programs) and provide broader opportunities for funding collaborative activities.

Among the large amount of topics that have been discussed, CIRAD's experts have outlined the following as major themes of collaboration:

- Reclaimed water use for irrigation (North Adelaide Irrigation Scheme), with a special emphasis on the communication exercise.
- Evaporative basin management and modelling of the induced hydrological processes.
- Implementation of interstate water rights trade and elaboration of a salinity policy interfering with the first one.
- Assessment of the use of polymers for irrigation (drip irrigation).
- Privatising the Irrigation Trusts and local implementation of the water trade market.

The first theme has been developed in collaboration with United Waters in Adelaide. This Corporate has contacted CIRAD in Canberra afterwards, expressing its interest for further discussions. From an international perspective, the links developed by CSIRO and PCSI in South Africa, with local partners or IWMI, provide some ground for a joint initiative in this region.

Visit to New South Wales

The visit consisted in an overview of the Murrumbidgee Irrigation Area and the research undertaken by the CSIRO-LW in Griffith. It has to be noticed that this Research Group depends on the Sustainable Agriculture Program, located in Adelaide. The laboratory is ideally placed for maintaining awareness of the irrigated agriculture issues and, indeed, develop practical research in the field.

Among the research activities that have been discussed, CIRAD's experts have outlined the following as major themes of collaboration:

- Evaporation basin siting, design and management.
- Serial biological concentration of salt (FILTER system).
- Conjunctive use of groundwater.
- Development of Decision Support Systems and irrigation models (SWAGMAN).

From an international perspective, the laboratory has developed links in Pakistan and China where PCSI will surely have to invest in the forthcoming years. Beside the water management aspects, some interesting job has been done, concerning rice and maize stubble management.

Visit to Victoria

The visit consisted in an overview of the Shepparton Irrigation Region and the research undertaken by the ISIA in Tatura. The Institute is the largest development and extension Centre in rural Australia, supported by NRE-Victoria. CIRAD's experts have encountered scientists from the Sustainable Agriculture Program, in charge of soil, water and salinity issues.

Among the Soil and Water Section activities that have been presented, CIRAD's experts have outlined the following as major themes of collaboration:

- Serial biological concentration of saline drainage water (SBC system).
- Interaction of saline irrigation and sodicity of soils.
- Fate of Sodium under saline-sodic groundwater and wastewater reuse.
- Farm management of saline groundwater for controlling salinity.
- Whole farm planning in the Shepparton Irrigation Region.

Applied research and interaction with the stakeholders are common features of the work undertaken by the scientific team. The excellence of the Centre has been internationally recognised with the International Workshop on Sodicity held this year in Tatura. Strong links have been established with other teams in the Netherlands and Israel. Obviously, CIRAD's experts have noticed complementary aspects with the research undertaken in Griffith, but have clearly felt some rivalry between both groups as well.

Visit to Australian Capital Territory

The scientific visit consisted in meetings and interviews with scientists from ANU (CRES, RSPAS) and CSIRO-LW. CIRAD has already established links with CRES where P.Perez has been posted for one year on. The Centre has developed different projects concerning complex interactions between people, institutions and environment. Natural science, social science and economics tend to be integrated into a multi-disciplinary approach.

Concerning water management, several senior staff are acknowledged international experts, thus providing opportunities of collaboration in Australia or abroad:

- A catchment scale Decision Support System dedicated to salinity management.
- Groundwater conservation in the small atolls of the Pacific.
- Assessment of the flood risks and their social impact in the large valleys of India.
- Integrated water resource assessment and management in northern Thailand.

RSPAS is known as one of the most important resource Centre concerning South East Asia and the Pacific Islands. The School has gathered experts mainly in linguistic, geography, anthropology and social science. Several staff have already some connections with their French colleagues in the Pacific (Nle Caledonie, Vanuatu). Among on-going projects, the following are obviously relevant for PCSI:

- Resource Management Project in South East Asia.
- Food security issues and national data base implementation in Vanuatu.
- Water resource management in the small Pacific islands.

It has to be noticed that CRES and RSPAS are coming towards more collaborative initiatives in the future. This would put together a competitive pool of expertise ranging from hydrology to anthropology, with valuable networks in Asia and the Pacific. CIRAD's experts have given a high priority to this international vision. The French Embassy is likely to support a bilateral initiative in the Pacific as far as the local institutions are involved in the definition of the target.

Potentially, CSIRO-LW laboratory in Canberra is an important partner for CIRAD and PCSI. Unfortunately, the dates of visit have clashed with the agenda of many scientists attending internal meetings. Nevertheless, an interesting discussion has been held with the Environmental Processes and Resources Program leader. The laboratory has developed a strong expertise in modelling complex biophysical systems, such as predicting soil distribution at the regional scale, mapping salt distribution in the landscape, modelling sediment and nutrient delivery in the stream. Some of the topics discussed are eligible for future collaborations:

- Soil water and chemical dynamics.
- Spatial and temporal process integration in complex environments (SPICE).

4. Other outputs

LWRRDC has released its new strategic plan 2001-2006. It clearly emphasises the following Land and Water Management strategies:

- Defining Landscape as the relevant unit for policy implementation. Landscapes include people and are not confined to a particular scale or a particular issue. They have public amenity values and are inherently diverse.
- Focusing on the institutional dimension of Natural resource Management. Biophysical and economic assessments have to be completed with explicit social and political analysis.
- Conceiving communication as an integral part of R&D activities. Communication has to be adapted to the different audiences and has to take into account their different perceptions.

CIRAD's experts were stricken by the similarity between these concepts and the one defended by INRA/SAD or CIRAD/TERA in France. It has appeared highly justified to find an Australian laboratory to collaborate with for implementing such a strategy on the field.

It was confirmed that Water Management was not directly supported by DISR as LWRRDC and MDBC were sponsoring most of the activities in this area. Nevertheless, the Department is keen on regarding proposals for a bilateral workshop concerning irrigation with brackish water technologies. The organisation and fund raising could be facilitate through collaboration with EIDN.

ACIAR has already initiated some collaborative projects with France, involving CIRAD's laboratories. Concerning Water Management, ACIAR is susceptible to support a bilateral project, provided the theme and localisation fit with its own strategy. It has been recommended that any proposal should be presented to ACIAR from the early stages in order to avoid any misunderstanding.

EU through its PCRD5 program is able to support some collaborative project with European partners. Though EU is not directly sponsoring Australian partners, such a project can help them to secure a national budget. As the PCRD5 is favourable to water management issues and as PCRD6 framework is still unclear, it is obvious that the opportunity given by the last call (October 2001) should be regarded seriously.

It was confirmed that Agriculture & Environment will be the major theme supported by the Scientific Section of the French Embassy next year. CIRAD will coordinate and facilitate the scientific exchanges. At least, two proposals concerning water management will be supported during year 2001. A broader reflection concerning the financial support to triangular projects (France-Australia-Pacific or Asia) has been initiated.

5. Plan for Action

The following proposal for action has been elaborated by the CIRAD's experts. The potential partners listed should confirm their interest to CIRAD in order to secure the sources of funding for year 2001. Though the final proposal will have to be acknowledged by the PCSI partners, it has to be mentioned that the support from the French Embassy to the plan is already granted.

As a matter of fact, this has to be considered as a first step into an expending and strengthening collaboration between France and Australia on Water Management. The following years should see more opportunities of interaction. Actually, three components have been studied: (i) Use of brackish water or effluents for irrigation, (ii) Modelling social interactions linked with water management, (iii) Other scientific exchanges.

5.1. Use of brackish water or effluents for irrigation

Justification:

Soil degradation under irrigation through salinity or sodicity risks are encountered in several countries where PCSI's scientists are working. Domestic and industrial effluents reuse is also becoming a common feature in water management. Some technical solutions applied in Australia could be tested and/or modified to fit with local constraints in foreign countries, according to our own experience.

Description:

A French student could be sent to Australia for a duration of 4 months (April to July), in order to study the functioning of the Serial biological concentration of salt systems. As two approaches are developed by ISIA and CSIRO, in different production environments, it could be interesting to study both. The feasibility of such a collaboration mainly depends on the Australian partners commitment to it and to the local facilities given to the student.

Two senior scientists from PCSI could come to organise the French student's program with their Australian colleagues, participate to seminars and bring together elements for elaborating an international project proposal for year 2002-2005. Estimated period of stay: 15 days.

One Australian scientist could be invited to France, and then to one of PCSI's benchmark abroad (Morocco), to provide some expertise on the following topics: (i) Serial biological concentration of salt, (ii) Conjunctive use of groundwater. This expertise should be included in the terms of reference of the international project proposal. Estimated period of stay: 15 days.

Means:

The French partners can provide the means for the student's airfare and his(her) basic needs in Australia. They can support the two French scientists travel costs as well. The international round ticket for one Australian expert can also be sponsored.

The Australian partners should be able to provide basic accommodation and scientific environment to the student. The Australian expert coming to France will have to secure his (her) living expenses abroad.

Intellectual property rights linked with the French student's work should be shared between the partners involved in the research. Concerning the international project, potential sponsors and donors should be approached by each partner after informing the other liable parts.

5.2. Modelling social interactions linked with water management

Justification:

The Triple Bottom Line approach , accounting for ecological, economic and social criteria, is supported by LWRRDC in its R&D sponsored activities. PCSI's scientists working on extension services and technology transfer share this view that sustainability, as a dynamic and ever receding target, includes ecological integrity, social equity and economic efficiency. Multi Agent Systems provide new opportunities of integrating social, cultural or ethical aspects within negotiation support systems. They have been successfully used for water management issues, when water becomes a common resource subject to disputes (Senegal, Indonesia).

Description:

A French student could be sent to Australia for a duration of 4 months (April to July), in order to participate to the construction of a Multi Agent System with colleagues from CRES, RSPAS and CIRAD. This team is already working on a Decision Support System dedicated to water management in northern Thailand. The opportunity of having a validation trip to Thailand is actually under examination.

Two senior scientists from PCSI could come to Australia in order to help organising a Multi Agent Systems workshop to be held during the second semester of year 2001. They will also bring together elements for elaborating an international project proposal for year 2002-2005. Estimated period of stay: 15 days.

One French and one Australian scientist could travel to Pacific Islands (Nle Caledonie, Vanuatu, Kirabati) to prospect the opportunity of elaborating a collaborative project on groundwater management in the atoll islands (creation of a negotiation support tool).

Means

The French partners can provide the means for the student's airfare and his(her) basic needs in Australia. They can support the travel costs of the two French scientists coming to Australia and the one going to the Pacific Islands.

The Australian partners should be able to provide basic accommodation and scientific environment to the student. The Australian expert going to the Pacific Islands will have to secure his (her) travel costs.

Intellectual property rights linked with the French student's work should be shared between the partners involved in the research. Concerning the international project, potential sponsors and donors should be approached by each partner after informing the other liable parts.

5.3. Other scientific exchanges

As every laboratory visited has raised specific interests from the CIRAD's experts, it was necessary to secure some links with the ones that would not participate in the two proposals described above. First, a permanent link is available through P.Perez, seconded to ANU and French Embassy's adviser for Agriculture and Environment.

Scientific exchanges will be encouraged through a range of fellowships provided by the French Department of Research. Five fellowships have been allocated to Australia for next year. They concern Post-Doc scientists going to France for 12 to 18 months. P.Perez will assist any application from the visited laboratories. Deadline: 28/02/01.

Fellowships from CIRAD are also available for senior scientists. They cover short-term period visits to CIRAD in France (15 days to 1 month). P.Perez will assist any application from the visited laboratories. Deadline: 31/03/01.

6. Acknowledgements

CIRAD's experts sincerely acknowledge the kind and warm welcome they have received during their trip. They want to express special thanks to:

Paul Dalby (PIRSA), who organised their visit and field trip to Adelaide.
Liz Humphries (CSIRO), who organised their visit and field trip to Griffith.
Aravind Surapaneni (ISIA), who organised their visit and field trip to Tatura.
William Watson (ICAM), who organised their field trip to Yass.
Alain Moulet (French Emb.), who sponsored this trip.

APPENDIX 1: TIME SCHEDULE

Day	Institution	Location	Contacts
16	PIRSA Water Resources Group CSIRO Land & Water UNI. ADELAIDE Soil & Water Dept	Adelaide	P.Dalby, P.Cole, A.Richards, D.Young W.Meyer, G.Walker, P.Dillon, M.Young D.Chittleborough
17	CENTRAL IRRIGATION TRUST SA WATER ELDERS	Barmera Loxton Loxton	R.Bristow, R.Ralph A.Matner S.Philips
18	ACIAR	Canberra	I. Willet
19	CSIRO Land & Water	Griffith	L.Humphreys, J.Blackwell, S.Khan E.Christen, A.Prasad
20	ISIA Sustainable Agriculture Prog. GOLBURN VALLEY WATER	Tatura	A.Surapaneni, P.Fisher, A.Heuperman V.Hebart
21	First week debriefing	Canberra	
22	Departure Dr S.Marlet	Canberra	
23	ANU/ICAM ANU/RSPAS	Canberra	R.Wasson, A.Jakeman, W.Watson J.Fox, G.Ward, F.Cooke, M.Bourke A.Walker, D.Tryon
24	FIELD TRIP	Yass	W.Watson
25	LWRRDC EUROPEAN UNION Delegation	Canberra	A.Campbell J.Tuckwell
26	DISR International S&T EIDN FRENCH EMBASSY	Canberra	G.Rankin, F.Nguyen I.Bergman A.Moulet
27	CSIRO Land & Water	Canberra	C.Moran
28	Departure Dr R.Ducrot	Canberra	

APPENDIX 2: CONTACT LIST

Name		Institution	Position	location	Email
Rankin	Graeme	DISR	Head of International S&T	Canberra	rankin@isr.gov.au
Campbell	Andrew	LWRRDC	Executive Director	Canberra	andrew.campbell@lwrrdc.gov.au
Heuperman	Alfred	ISIA	resource management officer	Tatura	Alfred.heuperman@nre.vic.gov.au
Deren	Bridget	ISIA	product development	Tatura	brigette.deren@nre.vic.gov.au
Surapaneni	Aravind	ISIA	research scientist	Tatura	aravind.surapaneni@nre.vic.gov.au
Fisher	Peter	ISIA	senior scientist	Tatura	peter.fisher@nre.vic.gov.au
Blackwell	John	CSIRO Land and Water	research engineer	Griffith	john.blackwell@grf.clw.csiro.au
Humphreys	Liz	CSIRO Land and Water	Research Group leader	Griffith	liz.humphreys@grf.clw.csiro.au
Khan	Shahbaz	CSIRO Land and Water	research scientist	Griffith	shahbaz.khan@grf.clw.csiro.au
Wasson	Robert	ANU / CRES	Director	Canberra	Robert.wasson@anu.edu.au
Willet	Ian	ACIAR	Research program manager	Canberra	willet@aciar.gov.au
Tuckwell	John	EU Delegation	adviser	Canberra	john.tuckwell@ecdel.org.au
Bourke	Michael	ANU / RSPAS	Research fellow	Canberra	rmbourke@coombs.anu.edu.au
Tryon	Darell	ANU / RSPAS	deputy director	Canberra	Darell.tryon@anu.edu.au
Fox	James	ANU / RSPAS	Director	Canberra	jjf400@coombs.anu.edu.au
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Hope	Geoffrey	ANU / RSPAS	head	Canberra	geoff.hope@coombs.anu.edu.au
Watson	Bill	ANU/CRES	Visiting fellow	Canberra	bwatson@cres.anu.edu.au
Dalby	Paul	PIRSA	Research program coordinator	Adelaide	Dalby.paul@sagov.sa.gov.au
Moran	Chris	CSIRO Land and Water	Research program leader	Canberra	chris.moran@cbr.clw.csiro.au
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Young	Mike	CSIRO Land and water	Research Group leader	Adelaide	mike.young@adl.clw.csiro.au
Stevens	Daryl	CSIRO Land and Water	Environmental chemist	Adelaide	daryl.stevens@adl.clw.csiro.au
Young	Doug	PIRSA	N.R. Economics Consultant	Adelaide	young.doug@saugov.sa.au
Cox	Jim	CSIRO Land and Water	Soil hydrologist	Adelaide	Jim.Cox@adl.clw.csiro.au
Meyer	Wayne	CSIRO Land and water	Research program leader	Adelaide	Wayne.Meyer@adl.clw.csiro.au

Summary

This report presents the main results of a fifteen days trip in Australia by 3 scientists of CIRAD involved in water management research, in order to consolidate the CIRAD and PCSI (the Collaborative Programme on irrigation - water management CIRAD-Cemagref-Ird) with Australian partners and to develop collaborative projects abroad. The visit was supported by the French Embassy in Canberra. During year 2001, several initiatives will be launched according to existing relationships or contacts. The present report is proposing several opportunities of collaboration concerning Water Management, based on the discussions the CIRAD experts have had with their Australian colleagues.

Key word : Australia, water management, soil degradation, irrigated systems, collaboration